

## 1.6 Notes- Zeros

When given the zeros of a polynomial function a polynomial function can be formed.

Ex.

Given  $x = 7$ , and  $x = -2$ , write a polynomial function in **factored form** with these zeros.

Solution: If  $x = 7$ , then  $x - 7 = 0$  and if  $x = -2$ , then  $x + 2 = 0$ , so the factors are  $(x - 7)$  and  $(x + 2)$  which we use in the function:

$$f(x) = (x - 7)(x + 2)$$

To write the equation in **standard form**, **expand** (multiply the factors) of the polynomial function.

Ex.

$$f(x) = (x - 7)(x + 2) = x^2 - 5x - 14$$

So, the standard form of the polynomial function is:  $f(x) = x^2 - 5x - 14$

Practice:

Find the polynomial function with the given zeros. Write the function in both factored form and standard form.

1.  $x = -5, x = 2, x = 1$

2.  $x = 2$ , multiplicity 2,  $x = -3$

### Simplifying Radical Numbers

Ex. Simplify

1.  $\sqrt{24}$

2.  $\sqrt{-24}$

3.  $2\sqrt{120}$

## Multiplying Complex Numbers

Multiplying complex conjugate factors:

Sum of squares identity:  $A^2 + B^2 = (A + Bi)(A - Bi)$

When multiplying:  $(x - a - bi)(x - a + bi) = x^2 - 2ax + (a^2 + b^2)$

Remember:  $i^2 = -1$

Ex. Simplify

1.  $(5i)(2i)$

2.  $(3 - 2i)(-4 + i)$

3.  $(x - 2 - i)(x - 2 + i)$

**Factor over the complex numbers** (see pg. 24-25)

Use the quadratic formula to find the zeros, then write the zeros as factors.